Carbon, Oxygen, and Nitrogen Isotopic Analysis of *Mollusca: Unionidae* of the Ohio River System during the Anthropocene

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Isotopic compositions of *Obovaria olivaria*, *Leptodea fragilis*, and *Quadrula quadrula* of the Wabash River contain clues to the anthropogenic modifications they have undergone during the time of the shell formation. In this study we analyzed the isotopic composition of the carbon ($\delta^{13}C$), oxygen ($\delta^{18}O$), and nitrogen ($\delta^{15}N$) in the carbonate sampled from growth bands of the shells. These results are compared to published data, and with accurately documented historical river data to better understand the human impact on river systems in the Ohio River Valley in the last 250 years. Mollusks construct their shells using CO_2 and nitrogen that is dissolved in the water. Since mollusks are sedentary animals, their isotopic signatures will reflect the chemistry of the water in which they grow. Comparing the locality in which the mollusks lived to the chemical changes recorded in their shells over time will provide temporal-spatial constraints on the natural variability of the river as well as the influence of anthropogenic inputs. Specifically, the $\delta^{13}C$ and $\delta^{18}O$ stored in the shells of the mollusks record changes in the environment such as air and river temperature, acidity of the river, changes in the river chemical composition, and may indicate a change in the source of the water. The isotopic analysis of $\delta^{15}N$ recovered from the shell can help track changes in nutrient delivery during the time of shell formation. Through this geochemical study we hope to provide a much needed record of the timing and extent of human impact on river systems.

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